

**CLASS 307, ELECTRICAL TRANSMISSION OR INTERCONNECTION SYSTEMS****SECTION I - CLASS DEFINITION**

This is the residual class for all subject matter, not elsewhere classified, relating to electrical transmission or interconnection systems.

- (1) Note. This class was produced in 1953 by making official the unofficial digests which have been established by the examiners of Division 26 during the period from about 1900 onwards. A caveat is given: while it is believed that the titles and definitions are reasonably accurate, no assurance can be given that all the patents, issued prior to the date of reclassification, are in the proper subclass since only some of these patents were read during the reclassification project. Consequently, in making a thorough search in this class, it is advisable to investigate every subclass which may possibly be pertinent and not, in order to shorten the search, to rely upon the principle of superiority of subject matter because of position in the schedule, since that principle is applicable only in classes where each patent has been analyzed and placed in the schedule in accordance with that portion of the disclosed subject matter which is claimed.
- (2) Note. Since Class 307 takes, under the class definition, only subject matter relating to electrical transmission or interconnection systems not elsewhere classified, its scope can be determined only by determining the scope of other related classes, which classes are listed below under Search Class. Also consult the search notes and definitions of these classes.
- (3) Note. Many mechanical classes containing electrical disclosures, as where a machine has, as part thereof, some electrical features, such as controls. Consequently, in appropriate instances, the search must extend to the class or classes which relate to the environment in which the electrical disclosure might be found.

**SECTION II - REFERENCES TO OTHER CLASSES****SEE OR SEARCH CLASS:**

- 84, Music, subclasses 600+ for electric organs having interconnection and switching systems.
- 174, Electricity: Conductors and Insulators, appropriate subclasses, for the physical structure of conductors. Also note subclasses 2+ for lightning rod systems and subclasses 5+ for systems for protecting people and animals from electric shock hazard.
- 178, Telegraphy, appropriate subclasses, for telegraph systems.
- 191, Electricity: Transmission to Vehicles, for systems for distributing electricity between a stationary point and a movable vehicle. Note particularly subclasses 2+.
- 200, Electricity: Circuit Makers and Breakers, appropriate subclasses, for electric switches and circuit breakers.
- 204, Chemistry: Electrical and Wave Energy, appropriate subclasses, for electric systems utilized in electro-chemical apparatus, such as electrolytic and cathode sputtering apparatus.
- 219, Electric Heating, appropriate subclasses, especially subclasses 482+ for a heating device having a power supply and voltage or current regulation or current control means.
- 246, Railway Switches and Signals, appropriate subclasses, for electric circuits utilized in railway switches and signals.
- 250, Radiant Energy, appropriate subclasses, for the detection of nuclear or invisible electromagnetic radiation, the testing of material by nuclear or invisible electromagnetic radiation, infrared or thermal document barriers, fluorescent and phosphorescent applications, invisible radiant energy generation controlling means and supports for tested material radiation sources and radiation detectors.
- 290, Prime-Mover Dynamo Plants, appropriate subclasses, for electric circuits utilized in prime mover dynamo plants.
- 310, Electrical Generator or Motor Structure, appropriate subclasses, for the physical structure of electric generators and motors and electromagnetic clutches and for the circuits that relate to electromagnetic clutches.
- 313, Electric Lamp and Discharge Devices, appropriate subclasses, for the physical structure of electric lamp and discharge devices, per se.
- 314, Electric Lamp and Discharge Devices: Consumable Electrodes, for arc lamp circuits.

- 315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses for cathode rays tube circuits and electric lamp and space discharge device circuits.
- 318, Electricity: Motive Power Systems, appropriate subclasses for electric circuits utilized in electric motor systems.
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a battery or capacitor charging or discharging circuit.
- 322, Electricity: Single Generator Systems, appropriate subclasses for circuits utilized in single generator systems.
- 323, Electricity: Power Supply or Regulation Systems, appropriate subclasses, for circuits utilized in voltage magnitude and phase control systems.
- 324, Electricity: Measuring and Testing, appropriate subclasses for circuits utilized in electrical measuring, testing and sensing systems.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for an electronic digital logic circuit.
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous active device nonlinear circuits.
- 332, Modulators, appropriate subclasses for modulating systems.
- 333, Wave Transmission Lines and Networks, appropriate subclasses for transmission lines and networks, utilized in communications.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, appropriate subclasses for magnetically operated switches and circuit breakers.
- 340, Communications: Electrical, appropriate subclasses for miscellaneous signaling systems.
- 342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), appropriate subclasses for radio wave energy communication systems and antennas.
- 345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 418 through 475 for computer graphics processing.
- 346, Recorders, appropriate subclasses, especially subclasses 33+ for systems utilized with recorders.
- 348, Television, appropriate subclasses for television systems.
- 358, Facsimile and Static Presentation Processing, subclasses 1.1 through 1.18 for data processing for static presentation on fixed medium (e.g., printer), subclasses 500-540 for natural color facsimile, subclasses 400-498 for facsimile, and subclasses 296-304 for recording apparatus in facsimile.
- 361, Electricity: Electrical Systems and Devices, appropriate subclasses for miscellaneous electrical systems. Note subclasses 1+ for safety and protective systems, and and subclasses 139+ for control circuits for electromagnetic devices.
- 363, Electric Power Conversion Systems, appropriate subclasses for circuits utilized in electric conversion systems.
- 365, Static Information Storage and Retrieval, subclasses 185.01+ for floating gate memory storage (e.g., flash memory), subclass 73 for recirculation of information in a storage read/write system, subclass 78 for plural shift register memory devices, subclass 80 for magnetic shift register, per se, subclasses 129+ for storage systems using a particular storage element, subclasses 189.01+ for read/write circuits peculiar to a storage and retrieval system, and subclass 230 for addressing circuits peculiar to a storage and retrieval system.
- 370, Multiplex Communications, appropriate subclasses for multiplexing systems.
- 373, Industrial Electric Heating Furnaces, subclasses 70, 102+, 135+, and 147 for electric furnaces having significant electrical circuits.
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, for electrical pulse counters, dividers and shift registers.
- 378, X-Ray or Gamma Ray Systems or Devices, subclasses 91+ for circuits combined with X-ray devices.
- 379, Telephonic Communications, appropriate subclasses, for telephone systems.
- 386, Television Signal Processing for Dynamic Recording or Reproducing, appropriate subclasses for television recording systems.
- 445, Electric Lamp or Space Discharge Component or Device Manufacturing, appropriate subclasses, for circuits utilized in the manufacture or repair of electric lamp or electric space discharge devices.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for generic data processing control systems and subclasses 245-264 for data processing of robot control systems.

- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation and Audio Compression/Decompression, subclasses 200+ for artificial intelligence systems that process speech signals.
- 706, Data Processing: Intelligent Processing Systems and Methods, various subclasses for artificial intelligence systems that represent, apply, and acquire knowledge.
- 708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 1+ for electric hybrid computers, subclasses 100+ for electric digital calculating computers, and subclasses 800+ for electric analog computers.
- 712, Electrical Computers and Digital Data Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclass 300 for byte level interactions.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 1+ for reliability and availability in digital processing systems.

## SUBCLASSES

- 1** This subclass is indented under the class definition. Subject matter relating to systems having a common portion in which unlike currents flow or unlike potentials exist.
- (1) Note. One of the currents, for example, may be a direct current while the other current, for example, may be a pulse current.
- SEE OR SEARCH CLASS:
- 178, Telegraphy, subclass 49 for telegraphy having plural different types of currents superimposed upon a common circuit.
- 330, Amplifiers, subclasses 69, 84, 124+, 147, and 295 for amplifier systems involving plural signal input signal sources which may be superimposed.
- 340, Communications: Electrical, appropriate subclasses for miscellaneous communication systems having means for superimposing upon a common circuit plural types of current. Note particularly subclasses 288, 531+, 693.1+, 870.07, 870.11+, and 870.15.

- 370, Multiplex Communications, appropriate subclasses for multiplex systems.
- 379, Telephonic Communications, subclasses 66 and 90+ for telephone systems having means for superimposing upon a single circuit plural types of current.

**2** This subclass is indented under subclass 1. Subject matter having means for supplying alternating and direct currents.

- (1) Note. The alternating and direct current, for example, may be the superimposed unlike currents.

SEE OR SEARCH THIS CLASS, SUBCLASS:

22, and 26, for this subject matter.

**3** This subclass is indented under subclass 1. Subject matter in which the superimposed unlike currents have different frequencies or phase.

SEE OR SEARCH THIS CLASS, SUBCLASS:

27, for similar subject matter.

SEE OR SEARCH CLASS:

- 84, Music, subclasses 600+, especially subclasses 600+ for electric organs having means for superimposing currents of different frequency upon a common circuit.
- 332, Modulators, appropriate subclasses for systems for introducing frequency components by a modulation process.
- 363, Electric Power Conversion Systems, subclasses 1+, 39+, and 157+ for electric power conversion systems having means to introduce or to eliminate certain frequency components.

**4** This subclass is indented under subclass 1. Subject matter in which the superimposed unlike currents are currents of different voltage.

- (1) Note. One current, for example, may be the current from a source of constant voltage while the other current, for example, may be a current from a source of adjustable voltage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 28, for similar subject matter.  
43+, for this subject matter.

SEE OR SEARCH CLASS:

- 324, Electricity: Measuring and Testing, subclasses 98+ for systems for measuring voltage by balancing an unknown voltage against a known voltage in a common circuit.

- 5** This subclass is indented under subclass 4. Subject matter in which the different voltages are connected in series opposition to a voltage which has undesired variations, so as to produce a resultant output which is constant.

SEE OR SEARCH CLASS:

- 323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 354, inclusive, for this subject matter.

- 6** This subclass is indented under subclass 5. Subject matter having plural converters.

- (1) Note. The plural converters, for example, may be the plural sources of series connected voltages.

SEE OR SEARCH CLASS:

- 363, Electric Power Conversion Systems, appropriate subclasses for conversion systems for converting electricity, obtained from a single source and having a single output.

- 7** This subclass is indented under subclass 6. Subject matter having an induction transformer.

SEE OR SEARCH CLASS:

- 323, Electricity: Power Supply or Regulation Systems, subclasses 247, 301, 305, and 328 for transformer systems.  
336, Inductor Devices, appropriate subclasses for the structure of transformers and inductive reactors.

- 8** This subclass is indented under subclass 5. Subject matter having plural generators.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 84, and 153, for this subject matter.

SEE OR SEARCH CLASS:

- 290, Prime-Mover Dynamo Plants, appropriate subclasses for electric generator systems having significant prime mover features.  
322, Electricity: Single Generator Systems, appropriate subclasses for systems having a single generator.

## **9.1 VEHICLE MOUNTED SYSTEMS:**

This subclass is indented under the class definition. Subject matter comprising systems of electrical distribution mounted in vehicles.

- (1) Note. This subclass includes, for example, systems for distributing electric power along the length of a train made up of cars which can be coupled or uncoupled.

SEE OR SEARCH CLASS:

- 187, Elevator, Industrial Lift Truck, or Stationary Lift for Vehicle, subclasses 277+ for an elevator car control having an electrical component and subclass 413 for an electrical service line connection to an elevator car or an arrangement of such an electrical service line.  
191, Electricity: Transmission to Vehicles, subclass 2 for systems having significant means for distributing electricity between a stationary supply and a moving vehicle.  
213, Railway Draft Appliances, subclasses 1.3+ for combined couplers and electrical connectors for use in railway vehicles.  
246, Railway Switches and Signals, appropriate subclasses for train mounted systems utilized in connection with signalling or track switching. Note particularly subclasses 64+ and 166.1.  
315, Electric Lamp and Discharge Devices: Systems, subclasses 77+ for miscellaneous vehicle mounted systems having lamps or space discharge devices.

- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a charging system for a vehicular battery.
- 340, Communications: Electrical, subclasses 425.5+ for signalling systems utilized in vehicles.
- 10.1 Automobile:**  
This subclass is indented under subclass 9.1. Subject matter in which the vehicle is specifically a motor vehicle (i.e., an automobile).
- 10.2 Antitheft:**  
This subclass is indented under subclass 10.1. Subject matter including systems or devices which prevent unauthorized entry or use of an automobile.
- SEE OR SEARCH CLASS:  
180, Motor Vehicles, subclasses 287+ for antitheft systems which prevent unauthorized use by controlling one or more systems during operation of the vehicle, as by: (1) application of the brakes, (2) stoppage of the fuel supply, or (3) opening of the ignition circuit in response to a timer.
- 340, Communications: Electrical, subclasses 426.1 through 426.36 for alarms or indicators activated in response to an attempt at unauthorized entry or use of a vehicle.
- 10.3 Ignition or starting circuit lock:**  
This subclass is indented under subclass 10.2. Subject matter in which the antitheft device prevents activation of the ignition or starting circuits of an automobile.
- 10.4 Manual code input (e.g., push button):**  
This subclass is indented under subclass 10.3. Subject matter in which a plurality of manually operable coded push buttons are provided to activate the ignition or starting circuit of an automobile.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclass 171 for electrical systems and devices having a relay or solenoid activated by code pulses.
- 10.5 Coded record input (e.g., IC card):**  
This subclass is indented under subclass 10.3. Subject matter in which the ignition or starting system of an automobile is activated in response to the insertion of a coded record (such as a magnetic or integrated circuit card) into an appropriate reading device.
- SEE OR SEARCH CLASS:  
235, Registers, appropriate subclasses for coded record responsive systems, per se.
- 10.6 Ignition or starter circuits:**  
This subclass is indented under subclass 10.1. Subject matter including circuits which supply electrical power to a starter motor or to an ignition system of an automobile.
- SEE OR SEARCH CLASS:  
123, Internal-Combustion Engines, appropriate subclasses for ignition systems or starting devices which activate internal-combustion engines.
- 10.7 Battery protection:**  
This subclass is indented under subclass 10.1. Subject matter including device for protecting a battery of an automobile.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 636.1 through 636.21 for battery condition responsive indicating systems.
- 361, Electricity: Electrical Systems and Devices, subclasses 1+ for other means to provide for the safety and protection of electrical systems and devices.
- 10.8 Lighting circuits:**  
This subclass is indented under subclass 10.1. Subject matter including circuits for supplying electrical power to the various illuminating lamps of an automobile.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses for systems which supply electrical power to lamp and discharge

- devices and which include recitation of the actual device. Note particularly subclasses 76+ for vehicle head light systems having the lamp as a part thereof.
- 340, Communications: Electrical, subclasses 425.5+ for vehicle lighting circuits used for signalling purposes.
- 11** This subclass is indented under the class definition. Subject matter relating to systems having plural load circuits.
- SEE OR SEARCH CLASS:
- 174, Electricity: Conductors and Insulators, subclass 43 for overhead wire distributing systems having means for establishing branch connections.
- 315, Electric Lamp and Discharge Devices: Systems, appropriate subclasses for systems having plural cathode ray tubes, plural gas discharge devices or plural lamps.
- 318, Electricity: Motive Power Systems, subclasses 34+ for systems having plural electric motors.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous systems employing plural space discharge active elements.
- 330, Amplifiers, subclasses 73, 84, 124+, 148, and 295 for amplifier circuits having plural loads.
- 333, Wave Transmission Lines and Networks, subclasses 1+ for plural channel systems utilized in communications.
- 378, X-Ray or Gamma Ray Systems or Devices, subclass 92 for X-ray electrical systems having plural X-ray tubes.
- 12** This subclass is indented under subclass 11. Subject matter in which the plural load circuits have a common conductor or a common return.
- (1) Note. This subclass relates, for example, to three wire direct current systems.
- SEE OR SEARCH CLASS:
- 310, Electrical Generator or Motor Structure, subclasses 112+ and 126 for balancer sets, per se.
- 323, Electricity: Power Supply or Regulation Systems, subclass 202 for balancer set systems.
- 13** This subclass is indented under subclass 12. Subject matter relating to polyphase systems.
- SEE OR SEARCH CLASS:
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 137+ for polyphase systems for energizing space discharge devices or lamps.
- 323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for voltage control polyphase systems. Note section VIII, subsection B of the class definition for a statement of the line between polyphase voltage control systems to be found in Class 323 and elsewhere.
- 363, Electric Power Conversion Systems, subclasses 1+ and 148+ for phase conversion systems for converting one number of phases to another number of phases.
- 14** This subclass is indented under subclass 13. Subject matter relating to phase balancing systems for polyphase circuits.
- 15** This subclass is indented under subclass 12. Subject matter having plural loads connected in series.
- (1) Note. The system, for example, may be provided with means to control the voltage drop across the two loads in a certain ratio.
- SEE OR SEARCH CLASS:
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 185+ for serially connected plural space discharge device or lamp systems, such as constant current systems.
- 16** This subclass is indented under subclass 12. Subject matter having plural output generators.
- (1) Note. A single generator, for example, may have plural windings, some of which supply one output circuit and some of which supply another output circuit.

- 17** This subclass is indented under subclass 11. Subject matter relating to transformer connections.
- (1) Note. The subclass relates, for example, to transformer systems wherein a transformer has plural outputs.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, subclasses 215, 247, 301, 305, 328, and 355 for transformer systems.
- 18** This subclass is indented under subclass 11. Subject matter having plural sources of supply for the plural load circuits.
- SEE OR SEARCH CLASS:  
318, Electricity: Motive Power Systems, subclasses 105+ for plural motor systems having plural sources of supply.
- 19** This subclass is indented under subclass 18. Subject matter having means for interconnecting the plural sources of supply in such manner that energy may be transferred from one source of supply to another source of supply.
- 20** This subclass is indented under subclass 19. Subject matter having means to control the magnitude of the energy which is transferred between one source of supply and another source of supply.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, for pertinent subclass(es) as determined by schedule review.
- 21** This subclass is indented under subclass 19. Subject matter having diverse sources of energy supply.
- (1) Note. The diverse sources, for example, may be two alternating current transmission systems of different frequency which are not interconnected otherwise than by the circuits related to the subject matter of the subclass.
- 22** This subclass is indented under subclass 21. Subject matter in which the diverse sources of supply are sources of alternating current and direct current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2, and 26, for this subject matter.
- 23** This subclass is indented under subclass 18. Subject matter having a substitute or an alternate source of energy.
- (1) Note. This substitute or alternate source of energy, for example, may be a standby generator.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
64+, for this subject matter.
- SEE OR SEARCH CLASS:  
333, Wave Transmission Lines and Networks, subclass 3 for plural channel communication systems having means to automatically substitute one channel for another.
- 24** This subclass is indented under subclass 18. Subject matter having means to control the magnitude of power or current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
51, 55+ and 62, for this subject matter.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, for single source systems.
- 25** This subclass is indented under subclass 18. Subject matter in which the plural sources of supply are diverse.
- 26** This subclass is indented under subclass 25. Subject matter in which the two sources of supply are AC and DC sources.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
2, and 22, for this subject matter.

- 27** This subclass is indented under subclass 25. Subject matter in which the diverse sources of energy have different frequencies.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
3, for this subject matter.
- 28** This subclass is indented under subclass 25. Subject matter in which the diverse source of supply have different voltages.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
4+, for this subject matter.
- 29** This subclass is indented under subclass 18. Subject matter having means for selectively connecting either the plural loads or the plural sources.
- (1) Note. The loads or sources, for example, may be selectively connected in accordance with the magnitude of the power being drawn.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
38+, for this subject matter.  
125+, for switching systems responsive to an electric condition.
- 30** This subclass is indented under subclass 11. Subject matter having means to prevent coupling between one load circuit and another load circuit due to the internal impedance of a common source.
- (1) Note. The anticoupling means may, for example, be means for tuning the two load circuits to a certain condition of resonance to prevent coupling.
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, subclasses 32+ for electric conductors having means to prevent inductive effects between adjacent circuits. Also consult the search notes to these subclasses for related art.  
333, Wave Transmission Lines and Networks, subclasses 1+, especially subclasses 4+ for plural channel communication systems having means to prevent coupling between circuits.
- 31** This subclass is indented under subclass 11. Subject matter having means to control current or power.
- (1) Note. This subclass relates, for example, to voltage regulated power supplies having plural outputs.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, subclasses 294+ for this subject matter when the plural loads are space discharge or lamp devices.  
323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for miscellaneous means for regulating power in a single circuit.
- 32** This subclass is indented under subclass 31. Subject matter relating to the proportioning or dividing of the load current between plural load circuits.
- (1) Note. Means may be provided, for example, to keep the load current in one circuit constant as the load current in another circuit fluctuates.
- 33** This subclass is indented under subclass 31. Subject matter relating to means for keeping the current or power constant in magnitude.
- (1) Note. This subclass relates, for example, to systems wherein a useful load is replaced by a dummy load, of equal size, when the useful load is no longer desired, so that the magnitude of power drawn from the line is constant.
- 34** This subclass is indented under subclass 33. Subject matter in which the constant magnitude control is achieved by controlling one or more of the load circuits.
- 35** This subclass is indented under subclass 31. Subject matter having means to limit the amount of energy drawn in any circuit.



- SEE OR SEARCH THIS CLASS, SUBCLASS:  
125+, for this subject matter.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 354 for current or load regulation systems for regulating a load in a single circuit.
- 36** This subclass is indented under subclass 11. Subject matter relating to serially connected load circuits.
- (1) Note. This subclass relates, for example, to systems having plural load circuits connected in series across a constant voltage source with means to insure that the voltage drop across any of the load circuits does not become excessive when the load in other circuits fluctuates.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
15, for this subject matter.
- SEE OR SEARCH CLASS:  
191, Electricity: Transmission to Vehicles, subclass 11 for similar systems wherein plural vehicles are connected in series.
- 37** This subclass is indented under subclass 36. Subject matter relating to selective series parallel connections.
- SEE OR SEARCH CLASS:  
318, Electricity: Motive Power Systems, subclass 111 for plural electric motors connected in series-parallel arrangements.  
323, Electricity: Power Supply or Regulation Systems, subclass 346 for plural transformer systems wherein the transformers are connected in series-parallel.  
340, Communications: Electrical, subclasses 825+ for miscellaneous selective control systems.  
361, Electricity: Electrical Systems and Devices, subclasses 191+ for selectively controlled relay circuits.
- 38** This subclass is indented under subclass 11. Subject matter relating to selectively connected or controlled load circuits.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, subclass 292 for plural lamp or discharge device systems controlled by a manually operated keyboard or pattern controlled regulator, and subclasses 313+ for plural load device, plural lamp or discharge device systems having an electric switch in the supply circuit. Note especially indented subclasses 314+ for preselectable switching systems.  
333, Wave Transmission Lines and Networks, subclasses 101+ for plural channel systems utilized in communications having branched circuits with means to effect switching of the branched circuits.
- 39** This subclass is indented under subclass 38. Subject matter automatically responsive to a condition.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
86+, and 116+, for this subject matter.
- SEE OR SEARCH CLASS:  
333, Wave Transmission Lines and Networks, subclasses 2+ for plural channel communication systems having means which are automatically responsive to a condition.
- 40** This subclass is indented under subclass 38. Subject matter in which the selectively connected or controlled load circuits are responsive to a code.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 825+ for miscellaneous code responsive circuits.  
361, Electricity: Electrical Systems and Devices, subclasses 171+ for code responsive control systems for electromagnetic devices.

- 41** This subclass is indented under subclass 38. Subject matter having means for sequentially or alternately connecting load circuits.
- SEE OR SEARCH CLASS:
- 315, Electric Lamp and Discharge Devices: Systems, subclass 323 for sequential starting of a plurality of lamps or space discharge devices.
- 318, Electricity: Motive Power Systems, subclass 102 for sequential or alternate starting and/or stopping of plural electric motors.
- 42** This subclass is indented under subclass 11. Subject matter relating to circuit arrangements or layouts with respect to geos:graphic territory.
- (1) Note. This subclass relates, for example, to systems for distributing electric power along the length of a railway and, for example, to systems for distributing electric power along and across a grid.
- 43** This subclass is indented under the class definition. Subject matter relating to plural supply circuits or sources.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 18+, for this subject matter.
- SEE OR SEARCH CLASS:
- 318, Electricity: Motive Power Systems, subclasses 105+ for plural electric motor supply systems having plural or diverse sources and subclasses 123+, 248 and 440+ for single electric motor systems having plural sources of supply.
- 330, Amplifiers, subclasses 69, 84, 124+, 147, and 295 for amplifier systems with plural input signal sources.
- 44** This subclass is indented under subclass 43. Subject matter in which one source floats across or compensates for voltage fluctuations in another source.
- 45** This subclass is indented under subclass 44. Subject matter having an electric conversion device intervening between one of the sources of power and the load.
- (1) Note. This subclass relates, for example, to systems having a flywheel energy storage type source of power floating between the ultimate source of power and the load.
- 46** This subclass is indented under subclass 45. Subject matter in which the intervening converter is a storage battery.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 48+, for this subject matter.
- SEE OR SEARCH CLASS:
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 86+ for electric lamp and discharge device systems having means to automatically substitute one power supply for another, and subclasses 160+ for electric lamp and discharge device systems having plural power supplies.
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a charging system for a vehicular battery.
- 47** This subclass is indented under subclass 44. Subject matter in which one of the energy sources is a dynamo electric type source.
- (1) Note. This subclass relates, for example, to systems having a floating motor-dynamo which has a massive inertia type flywheel.
- 48** This subclass is indented under subclass 44. Subject matter having a storage battery or accumulator type source.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 46, for this subject matter.
- 66, for standby storage battery systems.

- SEE OR SEARCH CLASS:
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 86+ for electric lamp and discharge device systems having means for automatically substituting one power supply for another and subclasses 160+ for electric lamp and discharge device systems having plural power supplies.
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a charging system for a vehicular battery.
- 322, Electricity: Single Generator Systems, subclass 88 for single generator systems having a battery source of excitation voltage.
- 49** This subclass is indented under subclass 48. Subject matter having an auxiliary source of voltage connected in series with the storage battery.
- (1) Note. The subclass relates, for example, to systems having a main source of energy in the form of a battery with an auxiliary source connected in series therewith to act as a booster or voltage regulator.
- SEE OR SEARCH CLASS:
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a charging system for a vehicular battery.
- 50** This subclass is indented under subclass 48. Subject matter having means for changing the taps of the cells, so that a variable number of cells are in the circuit.
- SEE OR SEARCH CLASS:
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for battery charging or discharging, especially subclasses 116+ for various series/parallel arrangements of cells or batteries.
- 323, Electricity: Power Supply or Regulation Systems, subclasses 255 and 340 for transformer tap changing systems.
- 51** This subclass is indented under subclass 43. Subject matter relating to circuits for controlling or preventing circulating currents which travel between the several supply circuits or sources.
- (1) Note. This subclass relates, for example, to systems having an equalizing bus to prevent circulating currents between several generators in parallel.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 57, for this subject matter.
- 52** This subclass is indented under subclass 43. Subject matter having means to control the load current.
- SEE OR SEARCH CLASS:
- 323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for systems for controlling the current or load in a single circuit supplied by a single source.
- 53** This subclass is indented under subclass 52. Subject matter relating to the control of the division of load between plural sources.
- SEE OR SEARCH CLASS:
- 318, Electricity: Motive Power Systems, subclass 88 for dynamic breaking systems having means to divide the load upon plural motors during their period of acting as brake generators.
- 54** This subclass is indented under subclass 53. Subject matter relating to the control of the load division between serially connected generators.
- (1) Note. The field of one generator, for example, may be connected across the armature of another generator which is in series with the first generator.
- 55** This subclass is indented under subclass 53. Subject matter in which the load current division is in a fixed or predetermined ratio.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
32, for similar subject matter.
- 56** This subclass is indented under subclass 55. Subject matter in which the plural sources are of diverse or unlike types.
- (1) Note. One source, for example, may be a DC generator while another, for example, may be a rotary converter.
- 57** This subclass is indented under subclass 55. Subject matter in which the plural sources are plural generators.
- (1) Note. This subclass relates, for example, to plural generators connected in parallel with equalizer means for insuring that each generator bears its proportionate share of the load.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
51, for this subject matter.
- 58** This subclass is indented under subclass 55. Subject matter in which the plural sources are plural converters.
- SEE OR SEARCH CLASS:  
363, Electric Power Conversion Systems, appropriate subclasses for single channel conversion systems for converting current of one type into current of another type.
- 59** This subclass is indented under subclass 53. Subject matter relating to load current division between plural sources in response to the size of a peak or excess load.
- 60** This subclass is indented under subclass 52. Subject matter relating to means for keeping constant the load or the current drawn by one of the sources.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 354 for systems for limiting the current or load on a single circuit.
- 61** This subclass is indented under subclass 60. Subject matter in which the plural sources are connected in series.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
36+, and 54, for similar subject matter.
- 62** This subclass is indented under subclass 52. Subject matter for limiting the load on the sources.
- (1) Note. This subclass relates, for example, to systems having means for limiting the total load drawn to a predetermined level.
- SEE OR SEARCH CLASS:  
323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 354 for single channel systems having means to limit the load.
- 63** This subclass is indented under subclass 52. Subject matter relating to serially connected sources.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
36+, 54 and 61, for this subject matter.
- 64** This subclass is indented under subclass 43. Subject matter having substitute or emergency sources of electric energy.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
23, for this subject matter.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, subclasses 86+ for lamp and space discharge device systems having means for automatically substituting one power supply for another.  
340, Communications: Electrical, subclass 333 for miscellaneous signal communication systems having means for substituting one power supply for another.

- 65** This subclass is indented under subclass 64. Subject matter having plural substitute sources.
- (1) Note. The plural substitute sources, for example, may be provided with means for making them effective in a predetermined sequence.
- 66** This subclass is indented under subclass 64. Subject matter in which a substitute or emergency source is a storage battery.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
46, and 48+, for this subject matter.
- SEE OR SEARCH CLASS:  
320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a charging system for a storage battery.  
322, Electricity: Single Generator Systems, subclass 88 for generator control systems having a battery source for the excitation winding.
- 67** This subclass is indented under subclass 66. Subject matter having a dynamoelectric machine for connecting the storage battery to the system.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
46, for this subject matter.
- 68** This subclass is indented under subclass 64. Subject matter in which the substitute or emergency source is a dynamoelectric source.
- (1) Note. The dynamoelectric source, for example, may be supplied with an inertia type massive flywheel and normally act as a motor across the line to supply current, as a generator, when the normal voltage supply is interrupted.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
44+, for this subject matter. Note especially indented subclass 47.
- 69** This subclass is indented under subclass 43. Subject matter having plural supply circuits or plural sources distributed along a load circuit.
- (1) Note. The plural supply circuits or sources, for example, may be distributed along the length of an electric trolley circuit.
- 70** This subclass is indented under subclass 43. Subject matter relating to the transfer of a load from one source to another source without loss of energy to the load and without the paralleling of the two sources.
- (1) Note. The two sources, for example, may be connected to the load by means of current limiting impedances which are varied in opposite directions, so that the load is transferred smoothly from one source to the other source.
- 71** This subclass is indented under subclass 43. Subject matter for alternatively connecting the plural supply circuits or plural sources in series or in parallel.
- SEE OR SEARCH CLASS:  
318, Electricity: Motive Power Systems, subclass 111 for plural electric motors having means for connecting them either in series or in parallel.  
320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for battery charging or discharging, especially subclasses 116+ for various series/parallel arrangements of cells or batteries.  
323, Electricity: Power Supply or Regulation Systems, subclass 346 for transformer systems having means to connect the transformers either in parallel or in series.
- 72** This subclass is indented under subclass 43. Subject matter in which the plural supply circuits or sources have diverse or unlike electrical characteristics.
- (1) Note. One source, for example, may be an alternating current source and the other source may be a direct current source.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
1+, for this subject matter.
- SEE OR SEARCH CLASS:  
318, Electricity: Motive Power Systems, subclasses 106+ and 149 for plural electric motor systems having diverse sources of power.  
320, Electricity: Battery or Capacitor Charging or Discharging, subclass 138 for a battery charging system having plural sources of supply.
- 73** This subclass is indented under subclass 72. Subject matter in which the diverse sources are different frequencies.
- SEE OR SEARCH CLASS:  
318, Electricity: Motive Power Systems, subclasses 807+ for electric motor systems having sources of different frequency of electric power, for regulating the speed of the motor.  
388, Electricity: Motor Control Systems, subclasses 805, 814 and 820 for running-speed control systems in which the frequency of a feedback signal is compared to the frequency of an input signal.
- 74** This subclass is indented under subclass 72. Subject matter in which the diverse or unlike electrical sources have different capacities.
- (1) Note. The diverse sources, for example, may have different voltage current characteristics.
- 75** This subclass is indented under subclass 72. Subject matter in which the diverse or unlike sources have different voltages.
- 76** This subclass is indented under subclass 75. Subject matter in which the sources of different voltage are generator sources.
- 77** This subclass is indented under subclass 43. Subject matter having plural supply circuits or plural sources connected in series.
- (1) Note. This subclass relates, for example, to transformers connected in series.
- 78** This subclass is indented under subclass 77. Subject matter in which the sources are generators.
- (1) Note. Plural generators, for example, may be connected in series to produce a high voltage.
- 80** This subclass is indented under subclass 43. Subject matter in which the plural sources or plural supply circuits may be selectively or optionally connected to the load.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
64+, for this subject matter.
- SEE OR SEARCH CLASS:  
333, Wave Transmission Lines and Networks, subclass 3 for miscellaneous plural channel communication systems having means to substitute one line for another.
- 81** This subclass is indented under subclass 80. Subject matter in which the plural sources or supply circuits are connected in a predetermined sequence.
- 82** This subclass is indented under subclass 43. Subject matter relating to plural converters.
- SEE OR SEARCH CLASS:  
363, Electric Power Conversion Systems, appropriate subclasses for conversion systems for converting electricity in one source circuit into a different type of electricity in a single load circuit.
- 83** This subclass is indented under subclass 43. Subject matter relating to plural transformers.
- 84** This subclass is indented under subclass 43. Subject matter relating to plural generators.
- SEE OR SEARCH CLASS:  
322, Electricity: Single Generator Systems, appropriate subclasses for single generator systems.
- 85** This subclass is indented under subclass 43. Subject matter relating to connecting and disconnecting systems.

- (1) Note. This subclass relates, for example, to systems for connecting and disconnecting generators.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
112+, for this subject matter.
- 86** This subclass is indented under subclass 85. Subject matter in which the connection or disconnection is made automatically responsive to a condition.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
110+, for this subject matter.
- SEE OR SEARCH CLASS:  
322, Electricity: Single Generator Systems, subclasses 17+ for automatic condition responsive systems for connecting or disconnecting a single generator.  
361, Electricity: Electrical Systems and Devices, subclass 93.4 for abnormal current condition protection including automatic circuit reset after interruption of electric system.
- 87** This subclass is indented under subclass 86. Subject matter in which the condition is the obtainment of a certain voltage, frequency or phase relationship.
- 89** This subclass is indented under the class definition. Subject matter relating to systems which prevent induction or coupling to other systems.
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, subclasses 32+ for conductor structures which are designed so as to prevent interference.  
178, Telegraphy, subclass 69 for telegraph systems having means to prevent inductive effects.  
315, Electric Lamp and Discharge Devices: Systems, subclass 85 for electric lamp and discharge device systems having means to prevent radiation.
- 333, Wave Transmission Lines and Networks, subclass 12 for communication type transmission networks having means to prevent inductive effects.
- 336, Inductor Devices, subclasses 84+ for inductive devices with electric and/or magnetic shielding, also subclass 83 for inductors where the core forms the casing which affords shielding for the inductor.
- 343, Communications: Radio Wave Antennas, subclasses 841+, 851 and 905 for antennas involving shielding.
- 379, Telephonic Communications, subclasses 116+ for telephone systems having means to prevent inductive effects.
- 90** This subclass is indented under subclass 89. Subject matter having means for controlling the current which produces the induction.
- (1) Note. This subclass relates, for example, to systems having means for eliminating harmonics produced by arcs.
- 91** This subclass is indented under subclass 89. Subject matter having means for controlling a magnetic or electrostatic field.
- (1) Note. This subclass relates, for example, to systems having shielding means for preventing the radiation of a magnetic or variable electrostatic field.
- SEE OR SEARCH CLASS:  
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 508 for an integrated circuit with a metal shield layer, subclasses 659 and 660 for electromagnetic energy shielding of such devices, and subclass 662 for devices of this type with transmission line shielding.
- 95** This subclass is indented under the class definition. Subject matter relating to systems for preventing damage by electrolysis.
- (1) Note. This subclass relates, for example, to cathodic protection systems.

## SEE OR SEARCH CLASS:

204, Chemistry: Electrical and Wave Energy, subclasses 194+ for electrolytic apparatus, especially subclasses 196.01+ for electrolytic object protection apparatus.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, appropriate subclasses for electrolysis, especially subclasses 724+ for electrolytic protection of a metal or metal alloy object.

- 96** This subclass is indented under the class definition. Subject matter relating to the regulation of the current in a system by intermittent interruption of the circuit.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

132, for repetitive make and break systems, such as flasher systems.

## SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 209+ for electric lamp and discharge device systems having a periodic switch in the supply circuit.

318, Electricity: Motive Power Systems, subclasses 519+ and the classes referred to in the search notes to that subclass, for electric motor systems having circuit making and breaking means in the supply circuit to control the magnitude of the energy supplied.

322, Electricity: Single Generator Systems, subclass 70 for this subject matter utilized in an electric generator system.

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for miscellaneous switching regulators.

607, Surgery: Light, Thermal, and Electrical Application, subclasses 59+ for circuit interruption systems used in electrotherapeutics.

- 97** This subclass is indented under subclass 96. Subject matter automatically responsive to a condition.

- (1) Note. The condition, for example, may be speed of rotation.

- 98** This subclass is indented under the class definition. Subject matter relating to systems having combined impedance means and switch means for regulating the current in the system.

- (1) Note. This subclass relates, for example, to presettable systems for controlling current at a future time.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

96+, for this subject matter.

## SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for variable impedance systems for controlling the flow of current in a circuit.

- 99** This subclass is indented under subclass 98. Subject matter automatically responsive to a condition.

- (1) Note. The condition, for example, may be an overload condition.

- 100** This subclass is indented under the class definition. Subject matter relating to shunting and short circuiting systems.

## SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 223 for impedance systems for controlling the magnitude of the current, in which the impedance system is connected in shunt with a source and a load.

- 101** This subclass is indented under the class definition. Subject matter relating to the control of residual or remnant magnetism.

- (1) Note. This subclass relates, for example, to a control of the remnant magnetism in a dynamoelectric machine.



## SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 143+ for demagnetizing a magnetic field, and subclass 267 for demagnetizing systems and processes.

- 102** This subclass is indented under the class definition. Subject matter relating to stabilized, anti-hunting or anti-oscillation systems.

(1) Note. This subclass relates, for example, to long distance transmission systems having means to stabilize the system under fault conditions.

## SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 1+ for safety and protective systems, such as circuit breaker systems.

- 103** This subclass is indented under the class definition. Subject matter relating to line drop compensators.

(1) Note. This subclass relates, for example, to systems for regulating the voltage in a load circuit so that the voltage is constant regardless of line drop due to varying load.

## SEE OR SEARCH CLASS:

322, Electricity: Single Generator Systems, subclass 21 for single generator systems having means to automatically compensate the system for variable line drop.

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for this subject matter.

- 104** This subclass is indented under the class definition. Subject matter relating to electromagnet or other highly inductive systems.

(1) Note. This subclass relates, for example, to systems for regulating the current through an electromagnet.

## SEE OR SEARCH CLASS:

318, Electricity: Motive Power Systems, subclass 492 for electric motor systems having means to dissipate the magnetic energy of the field.

336, Inductor Devices, appropriate subclasses for the structure of transformer and inductive devices.

361, Electricity: Electrical Systems and Devices, subclasses 139+ for control circuits for electromagnetic devices.

- 105** This subclass is indented under the class definition. Subject matter relating to harmonic filters or neutralizers.

## SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 167+ for wave filters, per se.

334, Tuners, appropriate subclasses for tuners, per se, which are closely analogous to filters.

363, Electric Power Conversion Systems, subclasses 39+ for current conversion systems having filtering means.

379, Telephonic Communications, subclasses 116+ for interference elimination in telephone systems.

- 106** This subclass is indented under the class definition. Subject matter relating to systems for producing pulses or shaping waves.

(1) Note. This subclass relates, for example, to systems having an easily saturated transformer which produces a pulse output when over excited at its input or to other systems having nonlinear elements.

(2) Note. This subclass relates, for example, to systems producing pulses of particular wave shape.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

96+, for means for producing square waves by intermittent interruption of a circuit in which the ratio of the conduction to nonconduction state is variable, as, for example, in Tirril regulators.

- 132, for means for producing square waves by intermittent interruption of a circuit, where the ratio of conduction to nonconduction is not varied.
- SEE OR SEARCH CLASS:
- 84, Music, subclasses 600+ for electrical musical instruments having means to produce wave forms of desired shape.
- 331, Oscillators, appropriate subclasses, for electrical oscillators in general, particularly subclass 55 for plural oscillators provided with a pulsing circuit, subclass 78 for electrical noise or random wave generators, subclass 87 for magnetron type oscillators provided with pulsing means, subclass 106 for oscillators with periodic or repetitious amplitude (or amplitude and frequency) varying means, subclasses 111+ for transistor type relaxation oscillator, subclasses 129+ for relaxation oscillator, utilizing gaseous space discharge devices, subclasses 143+ for relaxation oscillators in general, subclasses 165+ for shock-excited resonant circuit oscillators, and subclasses 172+ for oscillators in general provided with oscillator pulsing circuits.
- 333, Wave Transmission Lines and Networks, subclass 20 for passive wave shaping filters.
- 107** This subclass is indented under subclass 106. Subject matter having means for rectifying or drectifying.
- (1) Note. This subclass relates, for example, to systems having a polyphase input which is rectified and controlled in such a manner as to produce a direct current pulse of desired wave form.
- SEE OR SEARCH CLASS:
- 363, Electric Power Conversion Systems, subclass 43 for inverter systems with means to add or eliminate frequency components by step wave, amplitude summation technique.
- 108** This subclass is indented under subclass 106. Subject matter having a capacitor.
- (1) Note. This subclass relates, for example, to pulse producing systems in which the energy of the pulse is stored in a capacitor before being released.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 108, for this subject matter.
- SEE OR SEARCH CLASS:
- 318, Electricity: Motive Power Systems, subclass 130 for this subject matter in combination with a reciprocating or oscillating electric motor.
- 320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging.
- 109** This subclass is indented under the class definition. Subject matter relating to systems having a capacitor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 108, for this subject matter.
- SEE OR SEARCH CLASS:
- 320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging.
- 323, Electricity: Power Supply or Regulation Systems, subclasses 208, 218, 233, 293, 352, and 364 for voltage magnitude and phase control systems utilizing a capacitor.
- 365, Static Information Storage and Retrieval, subclass 149 for read/write systems which store information in a capacitive element.
- 378, X-Ray or Gamma Ray Systems or Devices, subclass 103 for X-ray electrical systems having a capacitor with means to charge and discharge the capacitor.
- 110** This subclass is indented under subclass 109. Subject matter having plural capacitors which are charged and discharge alternately when alternately connected in parallel and in series, respectively or inversely.

- (1) Note. This subclass relates, for example, to systems utilizing plural capacitors as direct current transformers or as voltage multiplying means, such as the “surge generators”.
- 111** This subclass is indented under the class definition. Subject matter which is nonresponsive to frequency changes.
- (1) Note. This subclass relates, for example, to miscellaneous control systems which are provided with means to prevent the control system from acting in an improper manner, when the frequency of the system changes, where the frequency change is not significant to the operation of the control system.
- SEE OR SEARCH CLASS:  
365, Static Information Storage and Retrieval, appropriate subclass for the reading/writing of information in a static storage system.
- 112** This subclass is indented under the class definition. Subject matter relating to miscellaneous switching systems.
- (1) Note. This is a miscellaneous class for electrical switching systems and the search should be continued in all cases in any other class which may possibly be pertinent.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, subclass 362 and the search notes to this subclass for miscellaneous switching systems utilized to control a space discharge device or electric lamp.  
361, Electricity: Electrical Systems and Devices, subclasses 139+ for control circuits for electromagnetic devices.  
365, Static Information Storage and Retrieval, appropriate subclass for the reading/writing of information in a static storage system.
- 113** This subclass is indented under subclass 112. Subject matter having plural switches.
- 114** This subclass is indented under subclass 113. Subject matter relating to switching systems of the lazy-man type.
- (1) Note. This subclass relates, for example, to systems of the type where a single load can be controlled at either of two or more points, so that it is not necessary for the operator to be at the position where the load was previously controlled in order to control it at a subsequent time.
- 115** This subclass is indented under subclass 113. Subject matter in which the plural switches are selectively actuated.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 825+ for miscellaneous selective control systems utilized in communications.
- 116** This subclass is indented under subclass 112. Subject matter in which the switching system is automatically responsive to a condition.
- SEE OR SEARCH CLASS:  
200, Electricity: Circuit Markers and Breakers, subclass 600 for a capacitive switch, absent circuitry.  
333, Wave Transmission Lines and Networks, subclasses 2+ for plural channel communication systems automatically responsive to a condition and subclasses 17.1+ for single channel communication systems automatically responsive to a condition.  
340, Communications: Electrical, subclasses 500+ for this subject matter in combination with an alarm or indicator to indicate the condition.  
341, Coded Data Generation or Conversion, subclasses 33+ for a capacitive keyboard controlled code transmitter.  
361, Electricity: Electrical Systems and Devices, subclasses 139+ for miscellaneous electromagnetic and relay switching automatically responsive to a condition.

- 117** This subclass is indented under subclass 116. Subject matter in which the system is responsive to light, heat, vibratory or radiant energy.
- SEE OR SEARCH CLASS:  
 250, Radiant Energy, subclasses 206+ for miscellaneous photo-electric cell circuits.  
 361, Electricity: Electrical Systems and Devices, subclasses 173+ for photo cell controlled electromagnetic switching and relay systems.
- 118** This subclass is indented under subclass 116. Subject matter in which the system is responsive to fluid pressure, density, level, velocity or humidity.
- SEE OR SEARCH CLASS:  
 340, Communications: Electrical, subclasses 603+ for this subject matter in an electric alarm system.
- 119** This subclass is indented under subclass 116. Subject matter in which the system is responsive to mechanical force.
- (1) Note. The mechanical force, for example, may be indicative of the position of an element.
- 120** This subclass is indented under subclass 119. Subject matter in which the system is automatically responsive to speed, centrifugal or kinetic force.
- SEE OR SEARCH CLASS:  
 361, Electricity: Electrical Systems and Devices, subclasses 236+ for miscellaneous speed controlled systems.
- 121** This subclass is indented under subclass 120. Subject matter in which the system is automatically responsive to inertia or acceleration forces.
- SEE OR SEARCH CLASS:  
 73, Measuring and Testing, subclasses 514.01+ for an inertia type accelerometer.
- 122** This subclass is indented under subclass 120. Subject matter in which the system is automatically responsive to the direction of rotation of a rotating body.
- SEE OR SEARCH CLASS:  
 340, Communications: Electrical, subclass 672 for this subject matter in combination with signal or indicating means to indicate the direction of rotation of the shaft.
- 123** This subclass is indented under subclass 120. Subject matter in which the system is automatically responsive to the speed differential of two bodies.
- SEE OR SEARCH CLASS:  
 361, Electricity: Electrical Systems and Devices, subclasses 243+ for shaft synchronizing systems.
- 124** This subclass is indented under subclass 120. Subject matter in which the system is automatically responsive to torque.
- 125** This subclass is indented under subclass 116. Subject matter in which the condition to which the system is automatically responsive is an electrical condition.
- SEE OR SEARCH CLASS:  
 340, Communications: Electrical, subclasses 635+ and 657+ for this subject matter in combination with an alarm or indicator to indicate the condition.  
 361, Electricity: Electrical Systems and Devices, subclasses 1+ for safety and protective systems which are automatically responsive to a dangerous electrical condition, such as circuit breaker systems.
- 126** This subclass is indented under subclass 125. Subject matter in which the system is automatically responsive to power or energy.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 31+, and 52+, for this subject matter.

- 127** This subclass is indented under subclass 125. Subject matter in which the electrical condition to which the system is responsive is a condition of polarity, phase sequence or reverse flow.

SEE OR SEARCH THIS CLASS, SUBCLASS:

9.1+, for vehicle mounted systems.

SEE OR SEARCH CLASS:

320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for polarity control or sensing in a battery charging or discharging system, especially subclass 165 and Digest 15.

361, Electricity: Electrical Systems and Devices, subclasses 76, 77, 82, and 84+ for this subject matter combined with the safety and protection of a system or device.

- 128** This subclass is indented under subclass 125. Subject matter having a discrimination response to alternating current and direct current conditions.

(1) Note. This subclass relates, for example, to systems wherein a switching operation automatically takes place to accommodate the system to change of the source of power when the source changes between alternating and direct current conditions.

- 129** This subclass is indented under subclass 125. Subject matter in which the electrical condition, to which the system is automatically responsive, is frequency.

SEE OR SEARCH THIS CLASS, SUBCLASS:

73, for this subject matter.

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclasses 182+ for miscellaneous relay systems which are automatically responsive to frequency.

- 130** This subclass is indented under subclass 125. Subject matter in which the electrical condition to which the system is automatically responsive is voltage.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 303 for voltage magnitude control systems automatically responsive to voltage.

361, Electricity: Electrical Systems and Devices, subclasses 88+ for voltage responsive safety and protective systems, such as low voltage tripping systems.

- 131** This subclass is indented under subclass 125. Subject matter in which the electrical condition to which the system is automatically responsive is current.

- 132** This subclass is indented under subclass 112. Subject matter relating to systems having means for repetitively making and breaking a circuit.

(1) Note. This subclass relates, for example, to flashing systems, wherein the system is intermittently energized.

SEE OR SEARCH THIS CLASS, SUBCLASS:

96+, for this subject matter.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 209+ for this subject matter having an electric lamp or space discharge device in the load circuit.

318, Electricity: Motive Power Systems, subclasses 129+ for this subject matter having an electric motor in the load circuit.

323, Electricity: Power Supply or Regulation Systems, subclasses 282 and 351 for switching regulators.

331, Oscillators, appropriate subclasses, for electrical oscillators in general utilizing active elements other than circuit maker and breaker type or

- dynamoelectric machine type, see particularly subclass 111 for free-running pulse generators of the relaxation type utilizing transistors, subclasses 129+ for oscillators of the relaxation type utilizing gaseous space discharge devices, and subclasses 143+ for relaxation oscillators in general.
- 134** This subclass is indented under subclass 112. Subject matter relating to means for facilitating the operation of the system.
- (1) Note. This subclass relates, for example, to switching means, such as plugs and jacks, having means to neutralize the leakage capacitance of the parts of the circuit.
- 135** This subclass is indented under subclass 134. Subject matter having means to reduce the current or voltage of the circuit as a step, preliminary to the switching step.
- 137** This subclass is indented under subclass 134. Subject matter having means for conditioning switch contacts.
- (1) Note. This subclass relates, for example, to systems having means for vibrating the switch contacts, so that they are always in a polished condition, because of the mechanical wear on the contacts.
- 138** This subclass is indented under subclass 137. Subject matter having means to reverse the polarity of the contacts during use.
- (1) Note. This subclass relates, for example, to those systems in which polarity reversing of the contacts is used to prevent a transfer of metal continuously from one contact to the other with resultant pitting and buildup.
- 139** This subclass is indented under subclass 112. Subject matter having means for actuating the switch.
- (1) Note. This subclass relates, for example, to systems having means to actuate the switch by both electrical and mechanical means.
- 140** This subclass is indented under subclass 139. Subject matter having means to control a power circuit.
- (1) Note. This subclass relates, for example, to remote control systems for regulating a circuit.
- SEE OR SEARCH CLASS:  
335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 2+ for electromagnetically operated switches, per se.
- SEE OR SEARCH CLASS:  
340, Communications: Electrical, subclasses 825+ for miscellaneous selective systems, such as party line and remote control systems.
- 141** This subclass is indented under subclass 139. Subject matter having time delay or retarding means.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 195+ for miscellaneous relay systems having time delay means.
- 141.4** This subclass is indented under subclass 141. Subject matter having an electromagnetic operator which, when energized, mechanically initiates operation of the time delay means.
- 141.8** This subclass is indented under subclass 141. Subject matter wherein the time delay is achieved by means of serially connected switches operated by a timer.
- 142** This subclass is indented under subclass 139. Subject matter having locking, holding or breaking means for the switch.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclass 194 for miscellaneous relay circuits having holding means, such as a locking contact.
- 143** This subclass is indented under subclass 139. Subject matter having an electrical actuator for the switch.

- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 139+ for control circuits for electromagnetic devices.
- 144** This subclass is indented under subclass 139. Subject matter in which the switch is actuated by a fluid pressure actuator.
- 145** This subclass is indented under the class definition. Subject matter having a current collector or transfer device.
- SEE OR SEARCH CLASS:  
191, Electricity: Transmission to Vehicles, subclasses 2+ for systems of distribution utilized in electric railway systems.  
324, Electricity: Measuring and Testing, subclasses 323+ for geophysical exploration systems having means to pass current from a moving electrode into the earth. Note especially subclasses 347+.
- 146** This subclass is indented under the class definition. Subject matter relating to unidirectional conductor systems.
- 147** This subclass is indented under the class definition. Subject matter relating to conductor arrangements or structure.
- (1) Note. This subclass relates, for example, to electric distribution systems utilizing conductors which are arranged in pairs for the purpose of gaining greater reliability of service or for the purpose of providing sleet melting circuits.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclass 826 for wire distribution (e.g., harness, rack).
- 148** This subclass is indented under subclass 147. Subject matter having a multipart conductor with means to equalize the current in each of the parts.
- SEE OR SEARCH CLASS:  
174, Electricity: Conductors and Insulators, subclasses 128.1+ for plural strand conductor assemblies, per se.
- 149** This subclass is indented under the class definition. Subject matter relating to miscellaneous systems.
- 150** This subclass is indented under subclass 149. Subject matter relating to power packs.
- (1) Note. This subclass relates, for example, to systems for supplying a high voltage direct current from a battery source.
- 151** This subclass is indented under subclass 149. Subject matter relating to conversion systems.
- SEE OR SEARCH CLASS:  
341, Coded Data Generation or Conversion, appropriate subclasses for coded data conversion.  
363, Electric Power Conversion Systems, appropriate subclasses for this subject matter.
- 152** This subclass is indented under subclass 149. Subject matter automatically responsive to the rate of change of a system variable.
- (1) Note. This system variable, for example, may be frequency or voltage.
- 153** This subclass is indented under subclass 149. Subject matter relating to generator control systems.
- (1) Note. This subclass relates, for example, to means for keeping the load on a generator constant.
- SEE OR SEARCH CLASS:  
322, Electricity: Single Generator Systems, appropriate subclasses for this subject matter.
- 154** This subclass is indented under subclass 149. Subject matter having a particular or specifically recited load device.

- (1) Note. Continue the search in the class which relates to the specified load device.
- 155** This subclass is indented under subclass 154. Subject matter having plural diverse type load devices.
- (1) Note. This subclass relates, for example, to generators having both a lamp load and a power load.
- 156** This subclass is indented under subclass 155. Subject matter in which the plural load devices are combined in a structural manner.
- SEE OR SEARCH CLASS:  
336, Inductor Devices, appropriate subclasses for the structure of transformer and inductive devices.
- 157** This subclass is indented under subclass 154. Subject matter relating to lamp or discharge device loads.
- (1) Note. This subclass relates for example, to systems for energizing lamps or discharge devices in series parallel combinations where the lamp or discharge devices are not claimed.
- SEE OR SEARCH CLASS:  
315, Electric Lamp and Discharge Devices: Systems, for this subject matter.
- 326 PERSONNEL SAFETY OR LIMIT CONTROL FEATURES:**  
This subclass is indented under the class definition. Subject matter relating to self-protective, personnel safety, or limit control features.
- (1) Note. The subject matter in this subclass relates primarily to systems and devices for the protection of operating personnel.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 1+ for protection means utilized to protect systems and devices.
- 327 Parasitic current suppression:**  
This subclass is indented under subclass 326. Subject matter relating to the suppression of current due to some unintentional cause such as inequalities of temperature or of composition.
- 328 Interlock:**  
This subclass is indented under subclass 326. Subject matter relating to systems or devices which prevent the activation of another system or device until a preliminary condition has been met, or to prevent hazardous operation.
- 400 ELECTRETS:**  
This subclass is indented under the class definition. Subject matter wherein an element exhibits a permanent external electrostatic field due to internal polarization.
- (1) Note. Electrets, per se, are classified here.
- SEE OR SEARCH CLASS:  
29, Metal Working, subclass 886 for the mechanical manufacture of electrets.  
106, Compositions: Coating or Plastic, appropriate subclasses for a nonresinous plastic electrically insulating composition in an electrically non-charged state.  
260, Chemistry of Carbon Compounds, subclass 2.01 and appropriate classes and subclasses for a resinous plastic electrically-insulating composition in an electrically noncharged state.  
365, Static Information Storage and Retrieval, subclass 146 for electrets utilized for storage and retrieval of information.  
367, Communications, Electrical: Acoustic Wave Systems and Devices, subclass 170 for electrets used in a acoustic wave system.  
374, Thermal Measuring and Testing, subclass 177 for an electrical thermometer having a ferroelectric sensor.  
381, Electrical Audio Signal Processing Systems and Devices, subclass 191 for electrets used in a telephone.



**401 NONLINEAR REACTOR SYSTEMS (E.G., SATURABLE):**

This subclass is indented under the class definition. Subject matter comprising a nonlinear reactor which is a magnetic core reactor, the reactance of which is controlled by changing the saturation of the core by varying a superimposed unidirectional flux.

- (1) Note. This is the miscellaneous subclass for nonlinear reactor (e.g., saturated inductor ferrite dielectric) systems not elsewhere classified. The field of search should in every instance extend to the class which relates to the environment in which the system might be found, since a system such as, for example, an oscillator or amplifier, which is classifiable in another class on the basis of the overall function of the system is not classifiable in this subclass (Class 307, subclasses 401+) merely because the system utilizes a nonlinear reactor. This subclass will, however, take those portions of the nonlinear reactor systems which are so incomplete as not to furnish a basis for classification in any other class.
- (2) Note. Amplifiers having an active element which is a nonlinear reactor means are classified in Class 330, subclasses 7 and 8 for capacitive type and saturable reactor type amplifier devices, respectively. In general use with such devices is an a.c. power supply source. Where no filter is claimed to remove such a.c., components from the output signal, classification is herein and not in amplifiers. However, where a "demodulator" or "detector" is claimed instead of a rectifier and such filter means are disclosed but not claimed classification is in Class 330 with amplifiers. See class definitions thereof, sections VI and VII.
- (3) Note. Saturable reactor type shift registers and counters can be found in the appropriate subclass in Class 365.

SEE OR SEARCH THIS CLASS, SUBCLASS:

104, for highly inductive systems.

SEE OR SEARCH CLASS:

- 323, Electricity: Power Supply or Regulation Systems, subclasses 249, 302, 310, and 329 for saturable inductor voltage regulating systems.
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous systems employing space discharge active element devices.
- 329, Demodulators, subclasses 341+ for a frequency demodulator with pulse forming circuits (e.g., counter type) which may include a saturable reactor.
- 330, Amplifiers, subclasses 4.5+ for parametric amplifiers; and subclasses 7 and 8 for capacitive and saturable reactor type amplifiers. See (3) Note above.
- 331, Oscillators, subclass 107 for solid-state active element type oscillators wherein the active element may comprise ferromagnetic or ferroelectric material in the solid state.
- 333, Wave Transmission Lines and Networks, subclass 80 for negative resistance networks.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 227 for electromagnets with armature of the saturable magnetic type.
- 336, Inductor Devices, subclasses 155+ for inductive regulators (e.g., saturable type of high leakage reactance type).
- 365, Static Information Storage and Retrieval, appropriate subclasses for static reactor type memory systems.

**402 Parametrons:**

This subclass is indented under subclass 401. Subject matter wherein a device is used in which an energy source alters the value of a parameter of an energy storage element.

- (1) Note. A parametron is essentially a resonant circuit with a nonlinear reactive element which oscillates at half the driving frequency. The oscillation can be made to represent a binary digit by the choice between two stationary phases  $\pi$  radians apart.

- (2) Note. Parametric excitation is the method of exciting and maintaining oscillation in which excitation results from a periodic variation in an energy storage element, e.g., capacitor or inductor.

- (3) Note. A digital circuit operates like a switch, i.e., it is either “on” or “off”.

SEE OR SEARCH CLASS:

- 330, Amplifiers, subclasses 4.5+ for linear parametric amplifiers.

#### **403 Thin film parametrons:**

This subclass is indented under subclass 402. Subject matter wherein the parametron is composed of thin film elements.

- (1) Note. Thin film is a film of conductive or insulating material, usually deposited by sputtering or evaporation, that may be made in a pattern to form electronic components and conductors on a substrate or used as insulation between successive layers of components.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 293, for thin film devices in nonlinear solid state device circuits and systems.

SEE OR SEARCH CLASS:

- 365, Static Information Storage and Retrieval, subclass 87 for thin film devices in magnetic shift registers; and subclasses 171+ for magnetic thin film device in systems using particular element.

#### **404 Using logic circuits:**

This subclass is indented under subclass 402. Subject matter wherein circuitry that performs logical functions is included in the parametron.

- (1) Note. A logic circuit is a circuit that provides an input-output relationship corresponding to a Boolean-algebra logic function.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 407, for logic circuits that are not used in parametrons.

SEE OR SEARCH CLASS:

- 365, Static Information Storage and Retrieval, subclass 89 for a magnetic shift register used as a logic device.  
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 100+ for digital logic devices which perform mathematical computations.

#### **405 Using pump energizer:**

This subclass is indented under subclass 402. Subject matter wherein a pump energizer is used in the parametron.

- (1) Note. A pump energizer is an oscillator that supplies an input signal to the parametron at a frequency,  $f$ , wherein the output of the parametron is  $f/2$ .

#### **406 Magnetic flip-flops:**

This subclass is indented under subclass 401. Subject matter wherein a ferroresonant circuit will flip to one stable state at a predetermined first voltage as the potential at the input increases, and will flip back to the other stable state at a predetermined second voltage (lower than the first voltage) as the potential of the input is decreasing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 289+, for flip-flop systems in general.  
414, for magnetic flip-flop used as trigger devices.  
415, for magnetic flip-flop used as switching devices.

SEE OR SEARCH CLASS:

- 365, Static Information Storage and Retrieval, subclasses 72, 154, 190, and 205 for various flip-flops utilized in a static memory system.

#### **407 Logic circuits:**

This subclass is indented under subclass 401. Subject matter wherein a logic function is performed by the nonlinear reactor system.

- (1) Note. A logic circuit is a circuit that provides an input-output relationship corresponding to a Boolean-algebra logic function.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 404, for logic circuits used in parametrons.  
 406, for magnetic flip-flops.
- SEE OR SEARCH CLASS:  
 365, Static Information Storage and Retrieval, subclass 89 for a magnetic shift register used as a logic device.  
 708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 100+ for digital logic devices which perform mathematical computations.
- 408 Multiaperture:**  
 This subclass is indented under subclass 407. Subject matter wherein the nonlinear saturable core has more than one aperture.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 422, for multiaperture nonlinear reactors that are not utilized in logic systems.
- SEE OR SEARCH CLASS:  
 365, Static Information Storage and Retrieval, subclass 90 for magnetic shift registers that use multiaperture cell.
- 409 Clocking, delay or transmission line:**  
 This subclass is indented under subclass 407. Subject matter including a transmission line between logic stages or including timing means such as a delay or clock for synchronizing or maintaining a synchronization between logic stages.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 452, 453 and 480+, for clocking, delay or transmission line used for performing logical operations with digital information.
- 410 Nor, not logic circuit:**  
 This subclass is indented under subclass 407. Subject matter including a Nor function that has an output when there is no input or both inputs (i.e., two inputs, one output) or a Not function that has one input, one output wherein the output is the inverse of the input.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 445+, for Not, Nor, or And devices that perform logical operations with digital information.
- 411 Exclusive or, and logic circuit:**  
 This subclass is indented under subclass 407. Subject matter comprising a circuit having two inputs wherein an output signal occurs if and only if one input is present (exclusive Or) or if both inputs are present (And).
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 471+, for And, Or device that performs electrical logical operations with digital information.
- 412 Driver circuits:**  
 This subclass is indented under subclass 401. Subject matter comprising an electrical circuit that supplies an input to the saturable reactor system.
- 413 Signal sensor (e.g., current or frequency):**  
 This subclass is indented under subclass 401. Subject matter that performs the initial conversion or control of measurement of energy in a nonlinear reactor system.
- 414 Magnetic trigger devices:**  
 This subclass is indented under subclass 401. Subject matter wherein saturable reactor means are provided for conditionally passing spontaneously or through application of an external stimulus a signal from one circuit to another circuit.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
 406, for magnetic flip-flops used as trigger devices.  
 415, for magnetic trigger devices used as switches.

**415 Magnetic switching circuits:**

This subclass is indented under subclass 401. Subject matter wherein a saturable reactor is used to place a device or circuit in an operating or nonoperating state.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

406, for magnetic flip-flops used as switching circuits.

414, for magnetic trigger devices used as switching circuits.

**416 Amplifiers using nonlinear reactors (i.e., magnetic amplifier):**

This subclass is indented under subclass 401. Subject matter wherein a device is used in which one or more saturable reactors are used, either alone or with other circuit elements to obtain power gain.

(1) Note. The type of devices classified here are nonlinear because the output is not a linear function of the input.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

490+, for nonlinear solid-state amplifiers.

SEE OR SEARCH CLASS:

330, Amplifiers, subclass 8 for saturable reactor type linear amplifying device.

**417 With transistors:**

This subclass is indented under subclass 416. Subject matter wherein a transistor is used in combination with the saturable reactor.

**418 With feedback:**

This subclass is indented under subclass 416. Subject matter wherein feedback is used in the magnetic amplifier circuit.

**419 Magnetic pulse generator:**

This subclass is indented under subclass 401. Subject matter wherein a saturable reactor is used in a device for generating a controlled series of pulses.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 291+ for miscellaneous clock or pulse waveform generating.

**420 Using multivibrator:**

This subclass is indented under subclass 419. Subject matter wherein a multivibrator is used in the magnetic pulse generator.

(1) Note. A multivibrator is a relaxation oscillator in which the in phase feedback voltage is obtained from two transistors. Typically, their outputs are coupled through resistive-capacitive elements. The time constants of the coupling elements determine the fundamental frequency, which may be further controlled by an external voltage.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 185+ for miscellaneous stable state circuits.

**421 With specified output waveform:**

This subclass is indented under subclass 419. Subject matter wherein a particular output waveform is generated.

**422 Multiaperture:**

This subclass is indented under subclass 401. Subject matter wherein the saturable reactor core has more than one aperture.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

408, for multiaperture cores used in logic circuits.

SEE OR SEARCH CLASS:

365, Static Information Storage and Retrieval, subclasses 90+ for multiaperture cells used in magnetic shift registers; and subclass 140 for multiaperture cell used in nonshifting magnetic systems.

**423 Three apertures or ladder:**

This subclass is indented under subclass 422. Subject matter wherein the saturable reactor core has three or more holes or is in the form of a ladder.

SEE OR SEARCH CLASS:

365, Static Information Storage and Retrieval, subclass 91 for multiaperture ladder structure used in shift registers.

**424 Parametric frequency converter:**

This subclass is indented under subclass 401. Subject matter wherein a device is used in which an energy source alters the value of a parameter of an energy storage element for frequency conversion.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 76.41 for electric current frequency measuring systems, utilizing heterodyne means; and subclass 85 for electric current phase measuring systems utilizing frequency conversion.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 113+ for miscellaneous frequency conversion circuits.

329, Demodulators, subclasses 323+, 346 or 358+ for frequency, phase or amplitude modulation demodulators combining the incoming signal with a second locally generated signal.

330, Amplifiers, subclasses 4.5+ for parametric amplifiers wherein the output signal waveform is an amplified replica of the input signal waveform and linearly related thereto.

331, Oscillators, subclasses 37+ for beat frequency oscillators.

332, Modulators, subclasses 117+ or 144+ for frequency or phase modulators, and particularly subclasses 140 and 142+ for variable reactance tubes in a frequency modulator.

359, Optics: Systems (Including Communication) and Elements, appropriate subclasses for optical systems, per se and subclasses 326+ for optical or quasi - optical parametric frequency converters.

363, Electric Power Conversion Systems, subclasses 1+ for frequency conversion without intermediate conversion to d.c. in cascaded or combined diverse conversion systems.

455, Telecommunications, subclasses 313+ for frequency converters adapted for use in modulated carrier wave receivers and wherein an incoming signal-modulated carrier wave is combined or mixed with a local carrier wave to produce an intermediate frequency signal of value lower than that of the incoming modulated carrier wave.

**650 WITH NONSWITCHING MEANS RESPONSIVE TO EXTERNAL NONELECTRICAL CONDITION:**

This subclass is indented under the class definition. Subject matter comprising an electronic circuit which has at least one nonswitching control component and is responsive to changes in external nonelectrical condition such as light, temperature, or flame and whereby an output current or voltage varies with variation of the external condition.

(1) Note. The systems defined above are to be distinguished from subject matter defining apparatus for converting nonelectrical energy directly into electric energy (e.g., electric batteries, dynamoelectric generators, etc.), condition measuring or testing apparatus which utilizes electron tubes and having means to automatically control the operation of the apparatus including means to give a qualitative or quantitative indication of the condition or change of condition, heating systems wherein an electron tube system utilized for controlling current in a heating load is controlled by a heat responsive element as a thermostat and closed loop electrical servo-type systems for positioning a servo-driven element responsive to a change in a condition.

- (2) Note. Subclasses 650 through 653 pertain to circuits having nonswitching control components responsive to a nonelectrical condition, mere switching control systems responsive to external conditions have been excluded and are found in Class 307, subclasses 116+, condition responsive switching systems and Class 327, subclasses 509+, nonlinear solid-state external effects switching systems.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 116, for external effects responsive switching system.

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, appropriate subclasses for systems responsive to measuring a particular condition such as subclasses 37+ for devices responsive to fluid pressure, subclasses 290+ for liquid level or depth gauge, and subclasses 570+ for devices responsive to vibration.
- 91, Motors: Expansible Chamber Type, subclasses 358+ for expansible chamber motors having working member position responsive feedback control.
- 102, Ammunition and Explosives, subclasses 211+ for fuses, primers, and ignition devices which utilizes electrical, magnetic wave, or radiant energy for proximity fuses.
- 122, Liquid Heaters and Vaporizers, subclasses 451+ for automatic feed means gravity, pressure or thermally controlled and subclasses 504+ for safety devices condition controlled.
- 128, Surgery, appropriate subclasses for electronic diagnostic apparatus responsive to some condition of the human body.
- 137, Fluid Handling, subclasses 87+ for self proportioning or correlating systems by specific gravity, temperature or heat content, viscosity, etc.
- 169, Fire Extinguishers, appropriate subclasses for systems automatically responsive to external conditions.

- 200, Electricity: Circuit Makers and Breakers, appropriate subclasses for switching means responsive to nonelectrical condition such as sound responsive, etc. (See subclasses 52+ and particularly subclasses 61.01 through 61.18, 80, 81, 84, and 85.)
- 246, Railway Switches and Signals, appropriate subclasses for electronic signaling or switching means which is controlled by the condition of the track or the position of a train on the track.
- 250, Radiant Energy, for methods and apparatus which may employ electron discharge tubes with a control electrode, particularly subclasses 200+ for photocell circuits and apparatus, especially subclass 214 for photocell controlled circuits in which the photocell controls an electron tube apparatus, subclasses 281+ for methods and apparatus for ionic separation or analysis (e.g., mass spectrometers), subclasses 306+ for methods and apparatus for the inspection of solids or liquids by charged particles, and subclasses 336.1+ for methods and apparatus for the detection of nuclear or electromagnetic radiant energy or the testing of materials including fluent materials by nuclear or electromagnetic radiant energy.
- 290, Prime-Mover Dynamo Plants, appropriate subclasses for dynamo systems controlled by some condition of the dynamo or the prime mover therefor.
- 307, Electrical Transmission or Interconnection Systems, appropriate subclasses for electrical systems controlled by a nonelectrical condition, see particularly subclasses 117, 118, and 119+.
- 315, Electric Lamp and Discharge Devices: Systems, subclasses 82+ for head light control systems.
- 318, Electricity: Motive Power Systems, appropriate subclasses, particularly subclasses 445+ for electric motor automatic starting or stopping means responsive to various conditions.
- 320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for an electronic circuit in a

- battery or capacitor charging or discharging system that is responsive to a condition of a battery or capacitor.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, And Systems, subclasses 509+ for nonlinear solid-state external effects switching systems.
- 330, Amplifiers, subclass 143 for amplifiers having a temperature responsive impedance in the circuit.
- 331, Oscillators, subclasses 65+ for oscillators in combination with a device responsive to external physical condition and in which the subject matter claimed recites a free running or self-sustaining oscillator system such as defined in section I of the class definition of Class 331.
- 337, Electricity: Electrothermally or Thermally Actuated Switches, for mechanical switches operated as a result of electrothermal and thermal action.
- 361, Electricity: Electrical Systems and Devices, appropriate subclasses, especially subclasses 1+ for safety and protection system; particularly subclasses 161+ for thermal control means; subclasses 173+ for photosensitive devices; and subclasses 236+ for speed controlled systems.
- 374, Thermal Measuring and Testing, appropriate subclasses for heat or temperature responsive measuring systems.
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers Circuits and Systems, for pulse counters and pulse counting systems.
- 378, X-Ray or Gamma Ray Systems or Devices, subclasses 44+, 51+, and 70+ for X-ray systems used in testing.
- 417, Pumps, subclasses 36+ for motor driven pumps controlled by a float.
- 431, Combustion, subclasses 78+ for an electrical circuit controlling a burner through a means sensing the presence or absence of a flame.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for data processing control systems and sub-
- classes 90-306 for the application of a computer in a particular art device.
- 651 Temperature responsive:**  
This subclass is indented under subclass 650. Subject matter wherein controlling or detecting means comprises means that are actuated by a change in heat such as a thermostat, temperature dependent resistor, or a semiconductor junction.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
117, for heat responsive devices in miscellaneous switching systems.
- SEE OR SEARCH CLASS:  
236, Automatic Temperature and Humidity Regulation, appropriate subclasses for control mechanisms responsive to temperature or humidity.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 512+ for temperature responsive external effect.
- 340, Communications: Electrical, particularly subclasses 500+ for alarm systems automatically responsive to a condition, for instance, subclasses 584+ for temperature responsive and subclass 602 for moisture or humidity responsive.
- 374, Thermal Measuring and Testing, appropriate subclasses for heat or temperature responsive measuring systems.
- 652 Responsive to approach or passage of an object:**  
This subclass is indented under subclass 650. Subject matter wherein controlling or detecting means comprises means that react to the proximity of something that is capable of being sensed.
- SEE OR SEARCH CLASS:  
200, Electricity: Circuit Makers and Breakers, subclasses 61.42+ for movable object controlled switches.
- 250, Radiant Energy, subclasses 221+ for optical or prephotocell systems controlled by article, person, or animal.

- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 509+ for proximity responsive external effects.
- 406, Conveyors: Fluid Current, subclasses 4+, 19+, and 31 for apparatus having an oscillator or other electron tube relay control means.

**653 Flame responsive (e.g., flame acts as a rectifier in circuit):**

This subclass is indented under subclass 650. Subject matter wherein a control or detecting means is constituted by a flame that completes an electric circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 117, for a condition responsive switching system which may be responsive to heat or a flame.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, subclass 554 for pre-photocell systems with a flame light source.
- 313, Electric Lamp and Discharge Devices, subclass 53 for discharge device structure wherein a flame provides an ionized path for the discharge.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 512+ and 514+ flame responsive external effects.
- 340, Communications: Electrical, subclasses 577+ and 600 for flame and radiant energy responsive signal systems respectively.

END